

**Scott D. Fowler**  
**97 Yeager Road**  
**Lenhartsville, PA 19534**  
610-562-4761  
fowler@enter.net

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Ms. Magalie Roman Salas, Secretary  
Office of the Secretary, TW-A306  
Federal Communications Commission  
445 12th Street, S.W.  
Washington, D.C. 20554

Re: MM Docket No. 99-25 -- Creation of a Low Power Radio Service

Dear Ms. Salas:

Attached, are my reply comments on this rule making proceeding.

This document was filed electronically and was written in Microsoft Word 6.0 format.

Respectfully submitted,  
Scott D. Fowler

## **Summary**

A substantial volume of comments on MM 99-25 support a low power service. However, existing stations enjoy substantial listenership; therefore they are providing public service. A low power service should supplement existing broadcast service, but it should not serve the few at the expense of the many. Potential interference to existing listeners, rather than broadcasters, should be the focus of concern .

The Commission should permit low power services on the FM and AM broadcast bands. Diverse groups have expressed interest in low power licenses. The use of AM spectrum can mitigate the need to relax interference standards on FM to meet demand. In urban areas, there will be insufficient space on FM, even with relaxed interference protection, to meet the demand.

LP1000 stations should be permitted. Proper regulation of local programming will address the programming concerns expressed in many comments. These signals will be needed to cover smaller cities, suburban and rural areas.

LP100 stations should be considered secondary, but concerns about secondary status can be reduced. LP100 stations should be protected from interference from newer LP1000 stations. LP100 stations should be allowed to receive interference from other stations. This will reduce much of the risk of operating a secondary station. Much of the FM spectrum has been developed; careful selection of an LP100 channel will substantially reduce the risk of an LP100 station being shut down. Most FM translators, also secondary, do not experience this problem. Existing Class D secondary stations should be protected as if they were LP100 stations.

The contour protection methodology should be used for low power service. The mileage separation method is obsolete and inefficient. The demand for spectrum is too great to use inefficient methods.

Interference to existing FM stations on 2nd and 3rd adjacent channels is a problem and no consensus has been reached. I proposed a method to change 2nd and 3rd adjacent channel protection from preclusive to restrictive. (See Radio World, "LPFM Without Interference," by Scott Fowler, August 18, 1999, page 5. This method protects existing broadcasters, especially low powered non-commercial stations, without precluding most LPFM service.

If LPFM service is implemented without adequate interference protections for existing services, a public back-lash against the service could occur. The result could be similar to the TV Channel 6 problem experienced by non-commercial stations in the reserved portion of the FM band. LPFM service could be severely restricted as a result of interference problems. Disruption of important subcarrier services on existing FM stations is another potential risk of unrestricted LPFM implementation.

Commercial broadcast interests should be excluded from low power services. If this is not possible by law, impose local programming and service requirements that would assure the intent of low power service. Non-commercial broadcast interests should be permitted to participate in low power services. LPFM upgrades for AM stations should be permitted only if the AM band is open to low power applicants and then only if these upgrades reduce interference on AM and do

not permit AM broadcasters from serving a substantially greater or different area. Residency requirements for owners of low power stations should not be imposed.

Local origination must be carefully defined to prevent low power stations from acting as repeaters or satellite networks. The definition should allow low power stations in one area or region to share programming that counts as local programming. TIS services on FM, event broadcasting, and related activities should not be permitted. These services have limited public interest but will consume a substantial amount of spectrum. Their inclusion in the low power service could set a bad precedent. It could justify yard sales and billboards operating radio stations.

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## **Need for Low Power Radio Service**

### **Service Issues**

(MM Docket No. 99-25, III, A, §10-12)

1. Substantial public response to MM 99-25 supports the concept of a low power radio service. However, this support should not be construed as overwhelming. Although many comments advocate a need for such service, this need does imply that the vast majority of citizens are dissatisfied with existing radio stations or interested in low power radio.

2. If existing radio stations were failing to provide a public service, then these stations would have few listeners. However, many stations enjoy substantial listenership. Millions of citizens have remained silent on the issue of low power radio and continue to listen to existing radio stations. Thus, existing stations are providing public service and appear to provide this service to a majority of citizens.

3. Many of the comments express a general dissatisfaction, sometimes anger, with the state of broadcasting today. Many have cited corporate ownership of radio stations<sup>1</sup> and the consolidation and loss of local service resulting from the 1996 Telecommunications Act<sup>2</sup> as reasons for establishing a local low power radio service. Although an overwhelming dissatisfaction with the present state of broadcasting is unsupported by radio listening

<sup>1</sup>See Christina Craigo (comments filed 3/3/99), Dan Bettinger (comments filed 3/3/99), and Timothy Cramer (comments filed 2/25/99) as examples of the rhetoric regarding “corporate” ownership of broadcast stations.

<sup>2</sup>See Lynn A. Pastrick (comments filed 3/2/99), Suzanne Cloud (comments filed 8/3/99), and Lawrence J. Krudwig (comments filed 8/4/99) as examples of such viewpoints regarding the Act.

measurements (such as Arbitron ratings), it is reasonable to conclude that there is an increasing number of persons who are not adequately served by existing broadcasters.

4. My comment, submitted on 5/19/99, in §1-9 suggested that low power radio is needed in response to changes in the nature of our existing broadcast services caused by economic forces. However, existing broadcasters continue to serve the majority of the public. In §2 of my comments, I described a problem of “deficiency of service” by broadcasters. This problem could be addressed by a low power radio service.

5. A low power service should be authorized to address this underserved audience. However, given that this audience is relatively small, a low power radio service should be considered a supplemental or secondary service with respect to existing stations; this service should provide programming targeted to a minority of citizens who are not adequately served by existing stations.

6. A low power radio service should not result in substantial interference to existing broadcast stations; otherwise, the public benefit of the new service will be offset by the loss of existing service. It would not be in the public interest to serve the few at the expense of the many. Some existing stations have few listeners and the service such stations provide is of marginal value. These services now preclude the reception of other more valuable signals. The low power radio service will provide a similar, limited, service; it will also preclude the usability of other signals. Thus, it is appropriate to authorize a low power service within the existing broadcast bands only if it will adequately protect the signals of existing stations.

7. It is relatively straightforward to ignore interference issues and advocate a low power service in concept and then convince others that it is a good idea. The filings of Susan Trescott-Ness on 7/29/99 and 8/31/99 show that such advocacy can be very successful. Unfortunately, these advocates tend to discredit broadcaster's objections as motivated by self-interest. Ness even speculates in her comments on page 2 of the 8/31/99 document that high-level officials who were not supportive of low power radio were under the influence of the broadcast lobby. Advocates choose to ignore that existing broadcasters are quite aware that more signals will result in more interference. The degradation of reception that continues on the AM band is a living legacy of poor spectrum management. Low power radio advocates may choose to deny the laws of Physics, but more signals will reduce the coverage of existing stations. This may be an issue for many radio listeners, even those who have been convinced that low power service is a good idea.



## **Spectrum Considerations**

### **Spectrum for Low Power AM Broadcast Stations**

(MM Docket No. 99-25, III, B, §15-17)

8. A few comments have supported some type of low power service on AM. REC Networks (REC, comments filed 5/25/99) supports low power service on AM in §84-89 as an overflow for locations where an FM channel would be unavailable. Herbert Schoenbolm (comments filed 5/27/99) also supports low power AM. It appears that the interest in low power broadcasting is so great that overflow is certain.<sup>3</sup> REC is also overestimating the availability of FM channels by assigning spectrum to low power stations outside the FM broadcast band. Although I have not been able to review every comment filed in this proceeding, I have not seen anyone other than myself who has addressed the allocation issues for low power AM stations in any substantial way.<sup>4</sup>

9. REC proposes to utilize §90.242(a)(2)(i) for low power AM allocations. REC also proposes a 10-watt limit, small antenna, and non-directional operation. I disagree with all of these proposals.

10. A 100-watt limit for low power AM stations should be considered. Many low power AM stations could be located in urban environments where FM channels are scarce. Here, a low power AM station may be a suitable substitute for FM microstations. In these environments,

<sup>3</sup>Many comments have indicated interest in low power licenses. These comments include diverse groups such as libraries, AM stations, churches, highway departments, toll bridges, governments, and individuals.

<sup>4</sup>See Appendix, §A1-13 of comments by Fowler, filed 5/19/99.

small antennas are probably the most practical option for AM, so efficiency is low. A 10-watt limit for such AM stations will be too low because such a station may not achieve adequate antenna efficiency to provide a city-grade coverage area equivalent to an FM microstation.<sup>11</sup> A 10-watt FM microstation serving an urban environment will have a 70 dBu city-grade contour distance of 1.8 km. The equivalent contour for an AM station is 3.16 mV/m; however 5 mV/m is considered city-grade for AM service. AM microstation having similar performance as the restrictions on TIS stations under §90.242(b)(4)(iv) would have a 2 mV/m contour at a distance of 1.5 km. Assuming a ground conductivity of 4 millimhos per meter, such an antenna operating at 1600 kHz has an effective field strength of 4.41 mV/m at 1 km. At a distance of 1.8 km, which corresponds to the city grade contour limit of a 10-watt FM microstation, such an AM station would have a field strength of 1.56 mV/m. To achieve a field strength of 5 mV/m at this distance, the AM station would need 103 watts. Thus, a 100-watt limit for low power AM stations should be considered to provide equivalent service of an FM microstation in an urban environment.

12. There is no reason why a low power AM station should not be allowed to use a more efficient antenna or use a directional array where space permits. REC did not offer any explanation for these restrictions. In rural areas, suburban communities, and small cities, low power AM stations with higher antenna efficiency may be suitable for equivalent service of an LP100 or LP1000 station. The use of a directional antenna for AM stations can be highly desirable for spectral efficiency, interference protection and site flexibility. However, the 10 dB limitation on directional antenna minimas that I have suggested for directional AM antennas<sup>5</sup> will

<sup>5</sup>See Appendix, §A2 of comments by Fowler, filed 5/19/99.

minimize the potential of interference to other stations from the use of critical arrays.

13. REC proposes to use §90.242(a)(2)(i) for TIS service to allocate low power AM stations. This is not an adequate method. These regulations do not include specific protections for 2nd and 3rd adjacent AM stations. The TIS service is also limited in audio repines to 3 kHz; thus very little modulation energy is transmitted that will affect 2nd or 3rd adjacent channels. Low power AM stations will have significant modulation energy above 3 kHz. Also, no provisions for skywave interference calculations are contained within those regulations. Even at 10 watts, low power AM stations should be required to demonstrate adequate skywave protection to all other stations except other secondary AM stations. In order to assure that the Commission's plans for improving AM reception are not affected, low power AM stations should be required to protect primary stations as proposed in my comments.<sup>6</sup>

<sup>6</sup>See Appendix, §A3-A13 of comments by Fowler, filed 5/19/99.

## **Technical Overview of LPFM Services**

### **LP1000 Stations**

14. Numerous comments, including those by Kevin D. Busse (filed 5/19/99) and Ivan A. Kapor (filed 5/26/99) suggest that LP1000 facilities should not be permitted. The reasons, generally, are that they have a coverage area too large for them to be community oriented and that they utilize too much spectrum.

15. The programming concerns for LP1000 stations can be addressed by proper controls on local programming and, if possible by law, on ownership. Although this regulatory oversight can be cumbersome for the Commission and licensee, it will help assure that objectives of the low power services are met. The technical concerns can also be addressed.

16. REC Networks (REC, 5/25/99) proposes to exclude all LP1000 stations with an ERP greater than 250 watts within 100 km of the top 100 markets. LP1000 stations with an ERP of 250 watts or less would be excluded within 100 km of the top 50 markets. REC justifies these restrictions based on limited spectrum space close to large markets.

17. The geographical preclusion for LP1000 stations as proposed by REC should not be adopted. There are many areas within 100 km of the top 100 markets that do not receive service from those markets. REC would limit low power service in these areas to 100-watt or 250-watt stations. In Zones I and I-A, where Class B stations are authorized, the service contours of signals in large markets extend about 65 km. A considerable gap exists at a distance of 65 to 100 km from a top 100 market where LP1000 stations could serve the public interest.

18. LP1000 stations should be permitted without geographical restriction. They will be useful to provide complete coverage to mid-sized communities or small cities near Top 100 markets. In Zone I, many cities exist within 100 km of Top 100 markets. The cities of Reading, Allentown and Bethlehem PA are within the 100 km circle around the Philadelphia market. These communities are distinct from Philadelphia and large enough to benefit from at least one LP1000 service. A larger city-grade signal will be needed for satisfactory service in smaller cities like them. As proposed, the distance to the 70 dBu city-grade contour of an LP1000 station is 8.0 km. The distance to the 70 dBu contour of an LP100 station is only 3.2 km. Thus, for many smaller cities, an LP100 station will not provide adequate service to the entire community.

### **LP100 Stations**

#### **Secondary Status Issue**

19. Comments by Jennifer Anne Barrios, (filed on 5/18/99) and Robert W. Federal (filed on 5/27/99) propose primary status for LP100 stations, citing similar arguments about the investment in such a station being at risk if it could be shut down by another station. REC proposes primary status for LP100 stations in the top 50 markets. These comments raise valid points and should be considered further.

#### **Secondary to Existing Stations**

20. It is difficult to justify primary status for LP100 stations with respect to any existing station because of the potential for spectral inefficiency. Such difficulties led to the elimination of Class D FM stations. Since then, the FM spectrum has been extensively developed in many areas,

so it is likely that a careful engineering study could determine a secondary frequency that would not be at great risk from changes by an existing facility. The potential risk of being forced off the air is further diminished if the secondary service is permitted to receive interference from changes in an existing facility. Thus, this is also justification that LP100 stations be permitted to receive interference from existing stations.

21. To further protect LP100 stations, they should be permitted to cause predicted interference to primary services if such interference is the result of a change in facilities of the primary service and the area of predicted interference that is created by such change is an area that was not served by the primary station prior to the change in facilities. Furthermore, such interference should not be applicable in the case of 2nd or 3rd adjacent channels. If new predicted interference to a primary station is caused by an existing LP100 station on a 2nd or 3rd adjacent channels as a result of a change in the primary station's frequency, then the only limitation on the LP100 station should be that the LP100 station may not increase the total area of interference as a result of a future change in operation.<sup>7</sup>

<sup>7</sup>See §48-65 of comments by Fowler, filed 5/19/99 for a methodology of protecting existing stations on 2nd and 3rd adjacent channels while permitting low power services on these channels. The method proposes to change the protections from preclusive to restrictive, with restrictions depending upon the ERP of the affected 2nd and 3rd adjacent channel stations. If the Commission adopts this methodology, limitations on the LP100 facility may not be required in the cited example.

22. These allowances would prevent LP100 stations from being forced off the air or down in power as a result of a site relocation or change in ERP or height of the existing station. However, these provisions will not protect an LP100 station from received interference, nor will it be protected from every possible change in frequency by a primary service. Such events would be extremely rare in urban areas where alternate spectrum for the primary service as well as the LP100 station would be scarce.

23. A problem also may arise for a secondary LP100 station if a new LP1000 station could also fit into the allocation environment. For example, it is possible that an LP100 station within an urban area may be disrupted by an LP1000 proposal in a nearby suburban area. Such proposals often will be co-channel occurrences because low power services are being contemplated on 2nd and 3rd adjacent channels of existing stations. This change in the allocation environment creates spectral holes, generally a single channel wide, between existing stations. In a limited geographical area, a 1000-watt signal might fit, but in a much larger area, due to the lesser 1st-adjacent or co-channel spacing requirements of 100-watt stations, only a 100-watt signal might fit. An LP100 applicant intending to serve the target community, therefore, would have to consider the feasibility or risk of a co-channel LP1000 authorization nearby.

24. The LP1000 allocation may not serve the intended audience effectively, so it would be more appropriate for the applicant to pursue an LP100 authorization within the intended service area. For example, the desired coverage is urban but the LP1000 allocation will not fit unless established in a nearby community. A nearby LP1000 signal, perhaps 10 km distant, may reach

the urban area, but its 8.0 km city-grade coverage radius will not render proper service to most of the target area.

25. The REC proposal seems to address this problem for LP100 stations by excluding LP1000 stations within 100 miles of the Top 100 markets. This limitation is too drastic. See §14-18 in these reply comments.

### **Protection from LP1000 Stations**

26. As an alternative to an exclusion zone proposed by REC, consider protecting existing LP100 stations from interference caused by new LP1000 stations. If an LP100 station precedes an LP1000 station, then the LP1000 station must protect the LP100 station. If LP100 stations are generally permitted to accept co-channel and 1st-adjacent channel interference, then a new LP1000 station need only protect the existing LP100's interference-free service area.

27. If an LP1000 station precedes an LP100 station, then the new LP100 station is considered secondary with respect to the existing LP1000 station and the new LP100 station must protect the existing LP1000 station to its protected contour. The existing LP1000 station need not protect the new LP100's service area and could make changes to its facilities without regard for the new LP100 station. Although this hierarchy in the allocation scheme adds some complexity, it provides additional protection for secondary LP100 stations without the need to exclude all LP1000 stations in certain geographical locations or to downgrade LP1000 stations to secondary services.



28. The additional protection for LP100 stations will be consistent for any existing LP100 station that upgrades to LP1000 status. Such a station would continue to protect other existing LP100 stations. In cases where an LP1000 might downgrade to LP100 status, whatever contour overlap may exist with other LP100 stations would be reduced or eliminated by the downgrade and any residual contour overlap should become “grandfathered.”

### **Existing Class D Stations**

29. Jeffrey S. Richman (Richman, comments filed 5/27/99) proposes to protect Class D stations from interference from LPFM services. I agree with Richman. However, Class D stations are secondary stations; therefore, special provisions must be made to protect existing Class D secondary stations from primary LP1000 stations. This can be achieved consistent with the protection discussed for LP100 stations in §26-28 of these reply comments. A Class D station could be reclassified as LP100, regardless of ERP, with respect to interference protection from and to other services. As an LPFM licensee, a former Class D station would become LP100 and be protected from interference from all other low power services. Such a station could be allowed to upgrade to LP1000, if possible.

## **Interference Protection Criteria**

### **Interference Protection Methodology** (MM Docket No. 99-25, III, D, §38-41)

30. Nassau Broadcasting Partners, L.P. (“Nassau” 5/25/99) believes that the contour overlap methodology should be used for allocating low power stations and argues that existing broadcasters should not be jeopardized for the sake of convenience and expediency. REC has proposed using the mileage separation method and presents a complex set of tables of mileage separations and has proposed many station classes and subclasses and additional classification categories for FM translators. The Commission has stated that the contour methodology is resource intensive and slows the licensing process.

31. I agree with Nassau; the contour overlap methodology should be used for the low power service. This will protect existing broadcasters to their protected contours and ultimately permit more low power services. Directional antennas can be utilized without penalty to give applicants more site flexibility, to increase spectral efficiency, and to resolve mutually exclusive applications. The short-term slowness of the licensing of low power stations will be offset by the long-term gain of authorizing maximum service. The existing methodology should be employed; terrain-dependent propagation models, if used, should serve only to increase the protections afforded by the existing methodology.

32. The proposed station classifications by REC are too complicated and demonstrate the problem with mileage separation tables. For all practical purposes, REC has used the contour overlap methodology to derive the tables. The use of mileage separation tables is obsolete. It is

very practical to study FM transmitter sites and calculate the resulting signal contours with computer software.

33. If the Commission believes it lacks the resources to review applications under the contour overlap methodology, then the Commission may lack the resources to implement and police this new broadcast service. Licenses will be available to former radio pirates and many novices who want to “play radio” or grab spectrum for private purposes. If the resources are not available to maintain technical compliance and protect the public interest, then MM 99-25 should be dismissed so that spectrum alternatives for amateur broadcasting can be developed. It will be a significant waste of resources for serious low power licensees if they must tolerate unruly and unregulated operators.

34. The problem of a slow licensing process is not caused by the contour overlap methodology, but by an application system which discourages first-come first-serve applications and creates strategic or economic advantage to those who file mutually exclusive applications.

**2nd-adjacent and 3rd-adjacent Interference Protection Criteria**  
(MM Docket No. 99-25, III, D, §42-50)

**The Need for Protection**

35. Numerous comments have suggested eliminating 2nd-adjacent and 3rd-adjacent interference protections for existing stations.<sup>8</sup> Sometimes the reason is simply stated: to fit in as many low power stations as possible. I can see how it is easy to argue against interference

<sup>8</sup>For example, see Andrew Morris (comments filed on 3/1/99), and Trident Media and Broadcasting, Ltd. (Comments filed on 2/24/99.)

protection if it prevents access to a license. Clearly, these protection requirements stand in the way of many special interests who want broadcast spectrum in prime locations. As much as low power advocates try to reveal the shameless self-interest of broadcasters, it is quite obvious that they are shamelessly pursuing their self-interest too.

36. Some arguments in favor of eliminating 2nd-adjacent and 3rd-adjacent interference protection are based on statements about improved receiver performance. The comments of Clarence E. Jones (Jones, filed on 5/27/99) are typical. Jones argues that 460 short-spaced full-power stations operate without interference. I have observed 2nd-adjacent interference problems within the coverage area of existing stations on several receivers in different locations. What Jones and others may be suggesting is that a lack of interference complaints to the FCC implies no interference. Few people will report interference to the FCC, especially if the area of interference has existed for a long time, as for many grandfathered short-spaced stations, and the public has learned to live with the interference.

37. Advocates of relaxed interference protection have failed to address the potential impact of 2nd-adjacent or 3rd-adjacent interference in urbanized areas where many strong signals are present. The potential for receiver induced intermodulation interference is high in these areas. However most of the grandfathered short-spaced stations do not involve two stations transmitting within the same community, as would be permitted routinely for LPFM service.

38. Jones further asserts that limits of 100 watts for low power service would eliminate the interference potential entirely. However, there are existing stations operating with powers of a few hundred watts or less. A 2nd-adjacent or 3rd-adjacent allocation of 100 watts in the same

community as an existing station operating at a low power could result in objectionable interference to the existing station in portions of that community. Since the coverage area of a lower powered existing station will be small, the impact of the area of interference caused by the new station will be great. Non-commercial educational stations are the majority of stations operating with minimum Class A facilities, and would be disproportionately affected by interference from low power services.

39. In the report by the FCC Laboratory Division (FCC Lab, filed on 8/5/99), they report that most of the receivers in their limited interim study showed at least 40 dB of interference rejection for 2nd-adjacent signals. A 3% distortion threshold was used to determine this point and an equivalent 60 dBu signal delivering 330  $\mu$ V to the receiver was used to make the measurements. Although these tests are interim and limited in the scope of receivers and tests, they suggest that adjacent channel tolerances for receivers surpass current protection requirements for 2nd and 3rd adjacent channel protection. However, this does not easily lead to a conclusion that 2nd and 3rd adjacent channel protection can be eliminated to establish a low power service.

40. There are three issues with the study of FCC Lab that must be examined before we can reach a tentative conclusion that 2nd and 3rd adjacent channel protection can be eliminated to establish a low power service. The issues are:

- 1) the definition of a threshold for interference,
- 2) the effect of propagation and multipath,
- 3) the behavior of receivers subjected to higher overall signal strengths in the presence of multiple strong signals that would be typical in an urban reception environment.

41. The definition of a threshold for interference. I doubt many would consider that a 3% distortion level is acceptable as a threshold of interference for a high-fidelity broadcast medium in competition with higher-fidelity digital media. Fortunately, the study by FCC Lab did report U/D ratios at 1% distortion levels, which occurred at U/D ratios 0-19.9 dB lower than at 3% distortion levels in the case of a stereo signal and a stereo interfering signal (*Table 2 of FCC Lab report*). The average difference in U/D ratio between 3% and 1% distortion among the 21 receivers in that test was 5.7 dB lower, averaging a U/D of 45.5 dB at 1% distortion for all receivers.

42. Propagation and multipath effects. FCC Lab fed a controlled 330  $\mu$ V signal into their receivers. This is the ideal receiving situation and is an appropriate method to obtain reproducible measurements. However, real-world reception will be far from ideal. In a mobile reception environment, receivers will be traveling through shadow zones and multipath zones of the desired signal that will cause the desired signal strength to fluctuate significantly. In a fixed reception environment, multipath will create areas of enhanced and degraded reception. Near a low power signal where unfavorable U/D ratios will exist, the proximity to a low power station may result in a propagation advantage over the more distant desired signal and this advantage will increase the

average U/D ratio over the value expected by usual contour prediction studies. Therefore, in mobile and stationary environments, U/D will fluctuate widely from the predicted ratio.

43. If a 20 dB variation from the mean U/D ratio could be expected for actual reception, the average margin of 45.5 dB U/D in the receiver study would be reduced to a margin of 25.5 dB U/D. Commercial FM allocations use the a 40 dB protection ratio for 2nd-adjacent and 3rd-adjacent channel stations, which exceeds the average margin for 2nd-adjacent interference tolerance of the tested radios under real-world reception conditions. Thus, commercial FM protections for 2nd-adjacent channels are inadequate if 20 dB variations from the mean U/D ratio occur for actual reception. Thus, we have some interference from grandfathered 2nd-adjacent stations. Existing non-commercial FM protections for 2nd-adjacent channels use a 20 dB protection ratio, and this ratio appears to be set appropriately, as the average margin of 25.5 dB U/D from the receiver study is roughly the minimum needed to overcome typical multipath and shadowing effects.

44. Receiver interference tolerances, often acceptable under steady-state signal conditions, are considerably lower under dynamic signal conditions. Therefore, averaged over a large number of receivers and receive locations, interference conditions may exist in locations where the signal of a 2nd-adjacent channel station is predicted to be 20 dB or greater than the desired signal. In those spots where U/D is sufficiently degraded, there will be difficulty for listeners to receive the desired signal.

45. Urban environment reception. The receiver tests of FCC Lab do not account for the prospect of having an interfering 2nd-adjacent LPFM signal of 80-100 dBu in an area where the

desired signal is 80 dBu and where there are multiple signals closely spaced that are also 80 dBu. This is typical of the urban reception environment, where receiver overload and resultant intermodulation interference could result. Here, the result may be that the nearby low power signal not only impairs the reception of a 2nd-adjacent signal, but the receiver intermodulation product between the nearby low power signal and strong signals affects reception of other signals.

### **Impact of Interference for LPFM**

46. We can see the result of implementing a new FM service without proper attention to interference issues. Consider the restrictions on non-commercial FM service requiring stations to protect TV Channel 6. When the Commission encouraged development of the non-commercial FM service and more stations began broadcasting or increased power, the public began to experience interference to their reception of TV Channel 6. The FM broadcasters were following the rules and operating compliant facilities, but political pressure mounted and ultimately substantial TV Channel 6 protections were imposed on all stations in the reserved band to limit the amount of interference.

47. The public valued its TV reception of commercial stations on Channel 6 more than the ability to receive public broadcasts over radio. Although TV receivers have improved and many viewers receive their signals over cable, the onerous protections for TV Channel 6 remain in effect today. As a result of developing the non-commercial FM service without regard for real-world interference, non-commercial FM stations within the Grade B of every TV Channel 6 are severely restricted.



48. The same risks are present for the low power radio service if the real-world interference effects on the majority of citizens are ignored. Therefore, a low power service must be implemented with appropriate interference controls.

49. After consideration of these three issues, the tentative conclusion is that some receivers will have problems in some locations within the areas of interference now predicted by conventional contour ratio studies used for FM stations in the reserved band. This strongly suggests that some 2nd-adjacent channel protection should be retained.

50. We should retain the 2nd and 3rd-adjacent protection requirements but change them from preclusive to restrictive to allow low power service.<sup>9</sup> These restrictions would go far to mitigate the interference impact of low power services on existing services, yet would not materially preclude the licensing of most low power channels. I also proposed that such restrictions for 2nd-adjacent stations be relaxed 10 dB for 3rd-adjacent channels. This 10 dB difference is supported by the test results of FCC Lab, where the report states: “overall, there appears to be approximately 10 dB better interference performance at the 3rd adjacent channel than at the second.” I also advocate low power service on the AM broadcast band under similar

<sup>9</sup>See §48-65 of comments by Fowler, filed 5/19/99 for a methodology of protecting existing stations on 2nd and 3rd adjacent channels that permits low power services on these channels. The methodology proposes to change the protections from preclusive to restrictive, with restrictions depending upon the ERP of the affected 2nd and 3rd adjacent channel stations.

technical limitations to provide more spectrum for this service. If both broadcast bands are utilized, it will be unnecessary to relax the FM protections excessively to fit all the allocations into one broadcast band.

### **Impact on Subcarrier Services**

51. Sun Sound Radio Reading Service (Sun, filed 5/19/99) objects to LPFM service. Sun provides programming to blind and visually impaired listeners primarily via FM subcarriers of non-commercial educational FM stations. Their concern is that LPFM service will degrade reception of their subcarrier service, which will affect disabled individuals. They assert a legal basis for protection of their service.

52. Sun's service and other SCA services will be affected by LPFM stations authorized on channels 2nd and 3rd adjacent to stations transmitting these services. The Commission can protect such services by retaining 2nd and 3rd adjacent interference protection but modify the protection from preclusive to restrictive. The restrictions I have proposed will protect lower power stations more, and provide greater protection within the 70 dBu contour of an existing station.

53. The extra protection that I propose inside the 70 dBu contour of 2nd and 3rd-adjacent channel stations affords reasonable protection to an SCA service that is generally acceptable within the 70 dBu contour. The limitations I propose beyond the 70 dBu contour out to the protected contour will afford the more protection for SCA services transmitted on weaker signals. Smaller stations are more likely to need SCA revenue for their survival, and they would receive more protection from interference by this method.

## **Ownership and Eligibility**

### **Local and Cross Ownership**

(MM Docket No. 99-25, III, F, §57-59)

### **Commercial Broadcast Interests**

54. Morris Broadcasting Company of New Jersey, Inc. (Morris, comments filed on 5/25/99) argues in §10 that existing broadcasters such as Morris should be permitted to own low power FM stations outside their existing markets. This should not be permitted for existing commercial licensees. If such ownership is permitted and commercial low power broadcasting is allowed, smaller commercial owners will expand their holdings by acquiring low power licenses. These smaller owners are unable to expand their holdings by competing with the larger owners for full service stations because they lack the capital to compete for the purchase of existing stations. So, they will view the low power service as a buying opportunity. The result could be a second-tier of consolidated ownership where smaller existing broadcasters would own as many low power services as possible to expand their operations. This second-tier consolidation would undermine the purpose of the low power service and preclude new entrants and persons or entities with limited financial resources from owning low power services. Therefore, non-commercial licensees and individuals with an attributable interest in non-commercial stations should be the only existing broadcast owners who may also own low power services.

55. If, by law, it is not possible to exclude existing commercial broadcasters from the low power service, then appropriate regulations must be established for the service so that existing broadcasters conform to the intent and purpose of the low power service. Such regulations could include local origination requirements and public affairs programming requirements.

### **Non-commercial Broadcast Interests**

56. I oppose the reply comments of Kenneth W. Bowles (Bowles, filed on 9/1/99) concerning existing “owners” of non-commercial stations. Bowles is proposing to exclude from LPFM ownership all individuals with an attributable interest in a non-commercial station. Bowles claims that such individuals “will have greater resources than new owners and will have an advantage in receiving construction permits.”

57. The Commission has routinely considered trustees, officers, or directors of a non-commercial station as not having an “attributable ownership interest.” In my comments (Fowler, filed on 5/19/99, §75), I have presented arguments that support this position. Only qualified non-profit organizations, not individuals, can own a non-commercial station under current statutes. These stations cannot operate legally under the Tax Code for the benefit of the individuals operating the non-profit station. Thus, there is no legal reason for these individuals, as Bowles states, to “have greater resources” as a result of such ownership.

### **LPFM Upgrades for AM Stations**

58. Morris Broadcasting Company of New Jersey, Inc. (Morris, comments filed on 5/25/99) believes that it should be permitted to divest its AM station in exchange for an LP1000. They seem to justify this exchange on the basis that they program to African-Americans and employ mostly African-Americans. Such station trades should not be permitted because of the ethnicity of ownership, hiring preferences, or current programming. Trades should be permitted

only under the two conditions described below. Otherwise, AM licensees such as Morris will effectively sell their existing license at present value and obtain an FM allocation for free:

(1) Low power services must be permitted on AM. Unless low power services are permitted on AM, no AM licensee should be able to trade for a low power FM station. Otherwise, LPFM service will simply become an upgrade path for many marginal AM stations and undermine the purpose of creating the LPFM service. Fewer LPFM stations will be available to new applicants.

(2) The existing AM allocation must be “divested.” “Divested” could mean “sold to others” only if the existing owner agrees to modify the station’s signal to conform to low power AM engineering requirements, which should include protection of all other existing AM stations on the same and 1st-adjacent channel to their 0.5 mV/m or lesser protected contours.<sup>10</sup> Existing 2nd and 3rd-adjacent channel overlap requirements or the limitations on ERP that I have proposed should be required. The present owner must pay for these modifications and they must be complete before the transfer of ownership control. “Divested” should mean that the AM station will be shut down and the allocation deleted if the signal cannot be conformed to protect all other stations. These conditions will assure that the Commission’s goal for AM improvement is not compromised by any low power AM authorizations.

<sup>10</sup> Daytime, nighttime, and critical hours contour protection requirements for low power AM stations were proposed in my comments (Fowler, filed 5/19/99) in §A3-A13. In §A13 of those comments, “LPFM” should read “low power AM.”

59. Morris asserts its need to migrate to the FM band due to AM coverage problems at night. However, this is not unique to their station; most AM stations have reduced coverage at

night. Thus, reduced nighttime coverage is not a reasonable basis for an existing AM station to migrate to FM. Furthermore, Morris's station is not licensed to the communities they desire to serve nor is the transmitter site located within any of these communities. Morris should have been aware of the location of their transmitter and its coverage limitations before their purchase of it. They fail to disclose that they serve their community of license with an interference-free signal at night. They have not demonstrated that their site cannot be relocated or engineered to better serve their target communities. Morris appears to want an opportunity to trade service in one area for service in another, rather than address or accept the limited coverage of their existing station or purchase another station that will serve their target audience.

60. Therefore, the Commission should further restrict any FM-for-AM trades so that licensees do not exercise an opportunity to serve a substantially greater or different area than the one they are licensed to serve. The new FM allocation to replace the AM allocation should be required to serve the same community, so that the new 70 dBu FM contour is contained within the old 5 mV/m AM daytime contour. Furthermore, the new 60 dBu FM contour should be contained within the old 2 mV/m AM daytime contour. A 10-year restriction should accompany such an FM license, so that the licensee cannot migrate to FM under these restrictions and then immediately file for improved facilities. The licensee could modify facilities during that 10-year period as long as the original contour restrictions continue to be met after modification. These restrictions also serve to maximize new low power FM allocations while permitting some AM-to-FM migration. After 10 years, the licensee is free to make facility improvements if spectrum space is available.

61. Mid-America Broadcasting Company, Inc. (Mid-America, comments filed on 5/18/99) argues for a non-commercial low power service. However, they also argue in §9 that AM daytimers should receive preference for a low power FM station, if available, if it results in improved service. Mid-Atlantic does not address the logical conflict that they are advocating. Clearly, a non-commercial low power service would make Mid-America and most other AM licensees unqualified to hold a low power license. Most AM daytimers are commercial stations. It is reasonable to assume that the AM daytimer would continue to operate as a commercial station on FM, with an apparent financial advantage over other low power FM services. This would serve Mid-America well, since it is licensee of such a daytimer, WGVM in Greenville, Mississippi. It operates on 1260 kHz with 5 kW daytime and 32 W nighttime.

62. If the Commission authorizes low power radio as a non-commercial service, then commercial AM stations should not be permitted to migrate to FM. Only non-commercial AM stations should be permitted to migrate to FM and only if low power service is permitted in the AM band.

### **Residency Requirements**

(MM Docket No. 99-25, III, F, §61-63)

63. Nassau Broadcasting Partners, LP (Nassau, filed on 5/25/99) and others argue for owner residency within the coverage area of a low power service. The coverage areas of some low power services will be quite small, requiring many owners to relocate within an unreasonably small geographical area. This is a significant burden on an individual applicant, both financially and otherwise, as it may require selling and purchasing a home, relocating children to new

schools, and other costs and compromises that may be involved with relocation. If the applicant is a group of individuals or an organization, the residency requirements become more challenging if they apply to everyone and require that the organization maintains its headquarters within the coverage area of the low power station.

64. A residency rule presumably would assure that low power license control is retained within the community. It would result in a *de facto* ownership limit. As a *de facto* ownership limit, such a rule may not withstand legal scrutiny.

65. A residency requirement would be inconsistent with §73.1125(a) of the Rules that permits the main studio of a station anywhere within a 25-mile radius of the community of license. A low power station's studio under §73.1125(a) could lie beyond the protected coverage contour of such a station. It is reasonable that any residency requirement, at a minimum, also permit similar flexibility.

66. Non-residential "owners" of a low power station may circumvent the residency rule by having a local resident willing to hold legal ownership, but allowing the non-residential "owner" control of the daily operations. Also, it is possible that a resident owner might seek a non-resident with proper qualifications to operate the station. Thus, control of programming is effectively transferred to a non-resident.

67. Thus, a residency requirement will be ineffective and unenforceable. It will not assure that low power license control is retained within the community of license. If a non-resident owner is deficient in serving the intended audience due to unique factors resulting from non-



residency, then there should be a tendency for that owner to correct these factors to improve the station's economic performance. The owner should have flexibility to correct these factors in the most reasonable manner.

## **Service Characteristics**

### **Local Programming**

(MM Docket No. 99-25, III, G, §68)

### **Local Origination Defined**

68. Nassau Broadcasting Partners, LP (Nassau, filed on 5/25/99) argues that a minimum local programming requirement should be considered for the low power radio service. Otherwise, according to Nassau, low power services will “simply subscribe to many satellite programming services and other ‘canned’ programming.”<sup>11</sup> I agree with Nassau. I have proposed that a low power station should be required to locally originate at least 10 hours of programming per week.<sup>12</sup> In view of Nassau’s comments, the definition of local origination must be more narrowly defined as a program produced live or pre-recorded at the low power station’s studio. It should also include similar programming from another low power station’s studio if the other station’s transmission facility is within a 50-mile radius of the station broadcasting the program.

69. The improved definition of local programming should discourage inappropriate uses for low power radio. Michael Boyle (Boyle, comments filed on 5/28/99) proposes to serve immigrant communities in several states by constructing a satellite network of low power stations. I believe his proposal is inappropriate and a local programming rule would discourage it. Boyle’s use of low power radio will not serve the public interest, but will serve the self-interests of his constituency. Low power radio should address local community issues. It should not target a

<sup>11</sup> See *Comments by Nassau, 5/25/99, §15*.

<sup>12</sup> See *Comments by Fowler, 5/19/99, §79*.

narrow demographic part of many communities dispersed over large geographical regions. Such audiences could be reached more effectively by the internet, satellite-distributed programming, or print media

70. A local programming requirement for the low power service will greatly diminish abusive uses such as the one proposed by Boyle. This requirement would force low power licensees to maintain a local studio presence. Yet, this would not impose an undue burden for low power operators who may establish regional networks that can address common issues of nearby communities. It would not hinder several low power services within one region from sharing local programming. Such sharing or cooperation will help create the most local programming and prevent the low power service from degrading into a cheap and easy “satellator” or automated mode of service.

### **TIS Services on FM**

71. The Texas Department of Transportation (Texas, comments filed on 5/28/99) proposes to utilize LPFM for TIS service. FM TIS should be prohibited. Experimental FM TIS stations were proposed by the New Jersey Highway Authority (NJHA) and were dismissed by the FCC in 1996.<sup>13</sup> Texas argues that “the low power radio service proposed will offer superior and more dependable communication...” The Commission, in 1996, agreed with National Public Radio, Inc. (NPR), who filed an informal objection against the NJHA proposal, when it said “granting an FM TIS authorization to an existing AM TIS licensee would be analogous to the WETA case,<sup>14</sup> where the Commission denied the application of a license seeking an ‘experimental’ authorization in a different broadcast band as a means of overcoming its

“dissatisfaction with the perceived quality of its existing operation.” Although the Commission’s statement was specific to NJHA’s experimental proposal, NPR cited substantial evidence in the NJHA application of an intention to create a permanent FM TIS service.

72. At the time of the 1996 NJHA decision, the Commission cited its review of FM TIS, reconsidered in 1991, in the Report and Order in MM Docket 87-267: “Our experience with TIS operation in the AM band has been very satisfactory.” The Commission further stated: “we are not inclined to facilitate the relocation of TIS to the FM band at this time.”<sup>15</sup> Since 1991, the expanded AM broadcast band has become available for TIS services and those services have grown dramatically. In the expanded band, the TIS services are subjected to less interference from existing AM stations.

73. Clearly, the Commission has made the point that FM spectrum for TIS is unwarranted based on superior and more dependable communication as argued by Texas. Texas is either unaware or chooses to ignore the Commission’s finding in the NJHA case, the WETA case, and the Commission’s own technical review of the TIS service in 1991. Texas advocating FM TIS, while opposing low power AM services because of interference to existing AM stations. Thus, Texas, who operates low power TIS AM stations, objects to similar low power services that will be owned by others.

<sup>13</sup> See the FCC’s Audio Services Division Decision, New Jersey Highway Authority, 7/29/96.

<sup>14</sup> See Greater Washington Educational Telecommunications Association (WETA), 53 FCC 2d 910 (1975).

<sup>15</sup> See 6 FCC Rcd 6273, at para. 200 (1991), as quoted and referenced in the documented cited in the NJHA case.

74. Texas also argues for FM spectrum to transmit subcarrier signals in support of future “Intelligent Transportation Systems.” However, subcarriers on a low power FM signal will not be robust, making such use ineffective. Not only is the present need nonexistent, the future need is not defined. Texas does not demonstrate that such subcarrier service is needed, and if so, that it is unavailable from existing FM stations.

75. In the 22 years since TIS has been authorized, existing broadcast stations have provided ever increasing traffic information service. Traffic reports on broadcast stations have become more timely and accurate. Some stations report traffic every ten minutes 24 hours a day. The traffic reporting services that provide information to broadcast stations have established extensive information networks; many have established camera locations along major highways that give instant feedback. As acceptance and use of FM RBDS increases, the traffic alert (TA) feature of RBDS will enable travelers to have even faster access to traffic information. However, all TIS stations I have heard play continuous loop messages and are not updated frequently. I never listen to TIS stations for traffic information; I seek a local AM/FM station that provides timely traffic information.

76. At this point, I question the need for AM TIS itself and object to the taxpayer expense of supporting AM TIS. We should not extend such a marginal service to FM. With respect to FM TIS, I agree with Bruce Perens (comments, filed 5/28/99) when he argues, in his objections to low power FM, “many of these stations will broadcast continuous-loop messages as do the present low-power AM stations. This material is more appropriate for the web or an answering machine.”

## **Event Broadcasts**

77. There have been comments advocating “event broadcasts.” Advocates want to broadcast sporadically to sports fans, to theme park customers, to travelers, and to event attendees. Even the National Hockey League filed for low power service and entities such as REC supported it.<sup>16</sup> These proposals should be dismissed. Private operators should not be allowed use of the public airwaves to enhance their services to their customers. Government entities should be prohibited too because many of them operate entertainment and tourist facilities. These activities have little to do with the purpose of government. Many of these “event broadcasts” should be called “private broadcasts,” which reveals them for what they really are. They are self-serving activities, whether they are for profit or for fundraising to supplement non-profit revenue or taxes. Such broadcasting will set a dangerous precedent for the use of broadcast spectrum and undermine the intent of providing programming to the general public.

78. We have many Part 15 and 90 services conducting private business or claiming to serve the public on the AM and FM broadcast bands. For example, there is real estate advertising on FM as we drive by homes for sale. We can listen to a movie on the radio at a drive-in theater. We can listen to church services in the car or inside the church with a walkman.

79. These private broadcast services are fine within the confines of their own private areas. However, some of these “services” show little regard or awareness for protecting licensed

<sup>16</sup> See ECFS comments posted on RM-9682.

stations. I encountered a listener asking for advice on how to seek relief from interference to his favorite station during his daily commute to work as he waited in traffic next to a house for sale that was “broadcasting.” We must not license these services in the public interest simply because these advocates believe they need more power to conduct their business.

80. There have been many novel applications proposed for the low power service that have limited purpose and will not serve a general public. Barry Magrill, P.E. (Magrill, comments filed 8/16/99) suggests using low power microstations to provide visitor information and traffic control for theme parks, airports, and government organizations. Lawrence J. Krudwig (Krudwig, comments, filed 8/4/99) discusses the ability to transmit emergency information and proposes broadcasts at air shows and races. City of Allentown (Allentown, comments filed 8/4/99) advocates a microradio service for enhancing community events and obtained an experimental license from the Commission to broadcast music and information to motorists viewing an annual holiday lights event.

81. These information or entertainment services should be excluded from the low power service. The low power service should supplement existing broadcast service by serving the general public. Although low power radio will serve the interests of the general public on a smaller scale than possible for existing stations, it should serve the individuals who reside within the service area of the station. Within this context, programming targeted to a specific audience that resides within that service area is in the public interest. However, programming targeted to non-residential visiting “customers” of theme parks, sporting arenas, light shows, etc., should not be construed as broadcasting in the public interest.

82. Such services could consume a substantial amount of radio spectrum and severely limit the implementation of the low power service to achieve its intended public interest objectives. It also risks interference to existing broadcast signals. Allentown states “The success of Allentown’s Experimental Station clearly demonstrates that microradio may in fact be operated without causing interference to existing full power FM stations.” The Allentown experimental station WX2XMA on 98.5 MHz was co-channel to WKRZ, Wilkes Barre, PA, which is an otherwise receivable signal. Even if Allentown is correct in this instance and no listeners to WKRZ actually lost service, the frequency could be used more effectively for several full-time microstations or an LP100 or LP1000 station serving the residents of the City of Allentown full-time.

83. Generally, these proposed services seem to be an electronic equivalent of a public address system or an electronic billboard, or are similar in nature to the marginal TIS service. The information provided by such services will be repetitive, frequently operate seasonally or for limited hours, and target a small number of mobile individuals. Even Allentown’s public event was targeted to motorists. It is unknown what would occupy the spectrum between events. If the events are in various areas, then larger coverage areas must be licensed to an event transmitter. Spectrum reservation for periodic events would preclude the use of that channel for community service the rest of the year. The broadcast of fill-in loop messages or programs between events (frequently done in the TIS service) to modulate a broadcast channel between “events” do not serve the public interest.



84. If such broadcasting is permitted, then we could have broadcast stations for everything, including yard sales. By permitting such broadcasts, other “needs” for broadcasting can be devised by analogy or extrapolation. We could have every billboard along a highway operating a one-watt transmitter under the argument that they need to “add value” to their advertisements to compete in the multimedia marketplace or to provide “traveler’s information” on how to get to a particular restaurant or hotel. This is similar to “house for sale” broadcasting.

85. If “event broadcasting” is permitted, event broadcasters may not bother to obtain a license or follow any interference rules under unlicensed operation. The technical review and regulatory oversight of an endless stream of such proposals would be costly as well. If a few watts are permitted for “event” broadcasts, operators will be tempted to use excess power. By the time an interference problem is traced to an “event broadcast,” the event, as well as the broadcasters are gone. The reason Part 15 is so restrictive is to keep these private broadcasts from getting out of their own backyards and bothering someone. Keep it that way. Do not permit periodic or special event broadcasting.

#### **Alternatives to Event Broadcasts**

86. If an event is worth broadcasting, then existing or low power broadcast services will broadcast a “remote” from that event. If event broadcasters such as Allentown want to broadcast their messages or programs, then they should consider approaching broadcasters or investigate alternate means of providing such service. Certainly, community low power services in the City of Allentown will want to cover these community events on their stations if such events merit such distribution. Such cooperation between community groups would help promote the low

power service. Broadcast spectrum governed under Part 73 of the Rules should be licensed only for continuous service from a fixed location to a specific community.

87. It is also reasonable that on-premises broadcasting under Part 15 of the Rules could be used to provide visitor and traffic information. Magrill does not offer evidence that operations under these existing rules are inadequate. Furthermore, Magrill does not discuss the inadequacy of any existing methods of distributing information or providing traffic control. However, Krudwig argues that Part 15 facilities are inadequate due to the size of some events. However, he may be unaware of technology that allows Part 15 facilities to cover larger areas, including use of multiple transmitters or use of radiating coaxial cable.

### **Operating Hours**

(MM Docket No. 99-25, III, G, §76-77)

88. Clarence E. Jones (comments, filed on 5/27/99) proposes no minimum operating schedule for LPFM service except for a 90-day limit on silent stations. In effect, an LPFM station could operate whenever its owners wanted to operate it. This does not serve the public interest. Weekly minimum schedules must be required to insure these stations will serve the public interest and not preclude other qualified applicants from providing better service.